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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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|-----------------|-------------|----------------------|---------------------|------------------|

10/694,077

10/27/2003

Dharmesh Jawarani

SC13056TP

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10/15/2004

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EXAMINER

GUERRERO, MARIA F

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 10/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/694,077

Applicant(s)

JAWARANI, DHARMESH

Examiner

Maria Guerrero

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is the First Action on the merits.

Status of Claims

2. Claims 1-30 are pending.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Information Disclosure Statement

4. The information disclosure statement filed October 27, 2003 has been considered.

Claim Objections

5. Claims 1-30 are objected to because of the following informalities: the claims recite the dose being in particles per centimeter squared. Clarification is requested. Appropriate correction is required.

Claim 1 recites the expressions: "wherein", "if". The language raised a question as to the limiting effect of the language in the claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-9, 13-16, 22, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Takasou (U.S. 6,274,447) (cited on IDS) in view of Yu (U.S. 6,514,829).

Takasou shows providing a polysilicon line over a semiconductor substrate and implanting xenon into the polysilicon line to amorphize an upper portion of the polysilicon line and upper portions of the source/drain regions (Fig. 3, col. 3, lines 17-20, col. 5, lines 23-35, col. 6, lines 23-44). Takasou teaches forming a metal silicide with the amorphized upper portion of the polysilicon line and the upper portions of the source/drain regions (Fig. 4-5, col. 6, lines 63-67, col. 7, lines 1-5). Takasou discloses implanting at a dosage level 3×10^{14} atoms/cm² and the energy of about 10 KeV or 30 KeV (col. 9, lines 15-20).

Furthermore, Takasou teaches forming a metal silicide with the amorphized upper portion of the polysilicon line and the upper portions of the source/drain regions and the metal silicide including cobalt silicide and nickel silicide (col. 6, lines 63-65, col. 7, lines 1-5). Takasou discloses any natural oxide film or the like that is present on the surfaces (dielectric liner) of the gate electrode and source/drain regions being removed (col. 6, lines 24-27, col. 10, lines 38-41).

Takasou does not specifically show the linewidth being less than or equal to 50 nanometers and the specific dosage as claimed. However, Yu shows providing a polysilicon line being less than or equal to 50 nanometers (col. 4, lines 30-45). Yu also teaches implanting at a dosage level 2×10^{14} atoms/cm² and energy of 10 KeV (col. 5, lines 53-60).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Takasou reference by including the linewidth and the dosage as taught by Yu in order to provide a thin transistor having reduced resistance (Yu, col. 4, lines 55-65).

Regarding the specific ranges claimed, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to specify the range as claimed by routine experimentation because there is not evidence of criticality. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990). See MPEP § 716.02 - § 716.02(g).

7. Claims 7-12, 15, 17-25, and 28-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsai et al. (U.S. 6,010,952) (cited on IDS) in view of Yu (U.S. 6,514,829).

Tsai et al. shows providing a polysilicon line over a semiconductor substrate and implanting xenon into the polysilicon line to amorphize an upper portion of the polysilicon line (col. 2, lines 65-67, col. 3, lines 1-15, col. 4, lines 5-7). Tsai et al. teaches implanting at a dosage level equivalent to an arsenic dosage ranging from about 1×10^{14} atoms/cm² to about 3×10^{14} atoms/cm² and the energy ranging from about 20 KeV to about 40 KeV (col. 4, lines 13-21). Furthermore, Tsai et al. discloses forming a metal silicide with the amorphized upper portion of the polysilicon line (Abstract, col. 5, lines 20-26).

Tsai et al. does not specifically show the linewidth of the polysilicon line being less than or equal to 50 nanometers. Tsai et al. does not specifically show the metal silicide including cobalt or nickel. However, Yu shows providing a polysilicon line being less than or equal to 50 nanometers (col. 4, lines 30-45). Yu teaches the metal silicide including cobalt silicide and nickel silicide (col. 4, lines 60-65). Yu also teaches implanting at a dosage level 2×10^{14} atoms/cm² and energy of 10 KeV (col. 5, lines 53-60).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Tsai et al. reference by including the linewidth and the cobalt silicide and nickel silicide as taught by Yu in order to provide a thin transistor having reduced resistance (Yu, col. 4, lines 55-65).

Regarding the specific ranges claimed, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to specify the range as claimed by routine experimentation because there is not evidence of criticality. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir.1990). See MPEP § 716.02 - § 716.02(g).

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yu (U.S. 6,642,122), Brady et al. ((U.S. 5,527,724), (EP 0622834 A2)), Kluth (U.S. 6,777,275), Wang et al. (U.S. 6,620,671), Moslehi (U.S. 5,156,994), Kittl et al. ((U.S. 6,004,871), (EP 0812009 A2)), Talwar et al. (U.S. 6,297,135) and Wei et al. (U.S. 2003/0162336) show several embodiments related to applicant's disclosure.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

October 5, 2004

Maria Guerrero
MARIA F. GUERRERO
PRIMARY EXAMINER